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3D Printing of Bone Spurs Before Surgical Removal

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Project Title: 3D Printing of Bone Spurs Before Surgical Removal

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Project Background: In the United States, 2% of the population will experience bone spurs, which will not resolve on their own.¹ Of people over 60 who experience a bone spur, 40% will require medical attention.² The soft tissue visualization appears to be difficult with imaging, leaving increased chance of poor balancing of the knee replacement. Osteophyte structure continues to be difficult to visualize in a 3D way and without their proper removal, can lead to increased rate of revision surgery. Having a 3D model of the bone spur may decrease risk of complication and enhance soft tissue modification for proper knee balancing post-knee replacement.

Proposed Methods: We are currently writing an IRB and research proposal for Rothman Institute to implement the proposed methods in a pilot study. We will 3D print a knee via MRI or CT that has been de-identified and provided by our mentor. The orthopedic surgeon will use this print out before or during surgery to address any concerns they have during the surgery in terms of proper balancing of the soft tissue of the knee. After approximately 10 uses within the OR, we will interview the surgeons for their feedback. We aim to measure outcomes including OR time and rate of revision. We hope to then apply for IRB approval of a larger study.

Results: Orthopedic surgeons and residents support the idea of a 3D model. Thus far we are waiting on approval of the research proposal for the pilot study. We anticipate reduced OR time.

Conclusions: CT is a better imaging modality for 3D printing. CTs are typically not done prior to knee replacement but have been increasingly utilized. We await feedback after use in the OR to determine the utility of this idea during OR time or if this will become a pre-operative endeavor.

WORD COUNT: 300

¹ Toumi, H., Davies, R., Mazon, M., Coursier, R., Best, T. M., Jennane, R., & Lespessailles, E. (2014). Changes in prevalence of calcaneal spurs in men & women: a random population from a trauma clinic. *BMC musculoskeletal disorders*, 15(1), 87.

² Morrison, William. "Bone Spurs and Osteophytosis." *Healthline*, Healthline Media, 22 Mar. 2017, www.healthline.com/health/bone-spurs-osteophytosis.

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